

TRANSIMS Version 1.1

Volume 6

Installation

LA-UR-00-1767

Disclaimer

These archived, draft documents describe TRANSIMS, Version 1.1, covered by the university research license. However, note that the documentation may be incomplete in some areas because of the ongoing TRANSIMS development. More recent documentation (for example, Version 2.0) may provide additional updated descriptions for Version 1.1, but also covers code changes beyond Version 1.1.

1. WHAT'S ON THE CD-ROM?

The TRANSIMS distribution found on the CD-ROM contains the directory structure shown in Fig. 1. Once installed, the distribution's root directory is referred to as *TRANSIMS_HOME*.

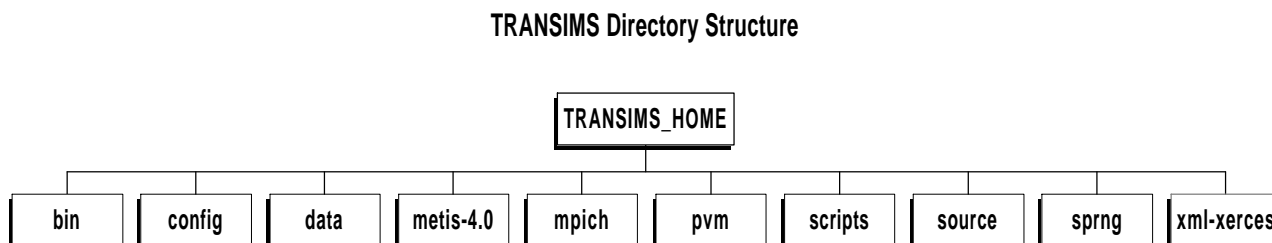


Fig. 1. Directory structure found on the TRANSIMS CD-ROM.

1.1 Distribution Description

1.1.1 *bin* Directory

The *bin* directory contains the executable programs compiled for Linux/Intel or Solaris/Sparc. It is a symbolic link to *linux/bin* or *solaris/bin*, as appropriate for the install architecture.

1.1.2 *config* Directory

The *config* directory contains XML and other files needed to run the configuration file editor.

1.1.3 *data* Directory

The *data* directory (see Fig. 2) contains subdirectories of scenarios to run the TRANSIMS components.

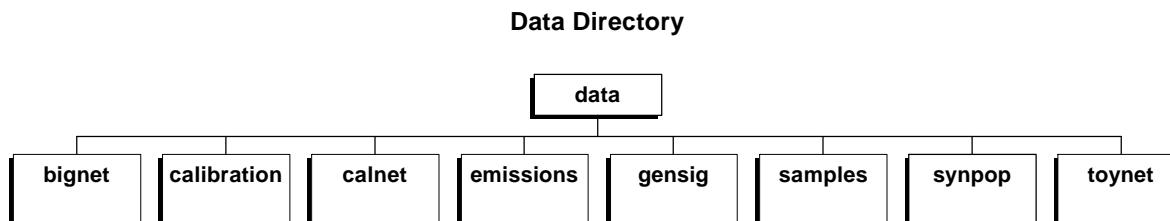


Fig. 2. This chart breaks out the TRANSIMS data directory.

- ***bignet*** – A large multimode scenario and network used to run the TRANSIMS components. The network contains ~16000 links.
- ***calibration*** – The microsimulation calibrations, which consist of one- and three-lane freeways, two-lane left turn, two-lane merge, and tee intersection networks.
- ***calnet*** –
 - *Multimode*, which consists of a multimode test network that uses simplified population and activity generation and feedback iterations
- ***emissions*** – Data files used by the Emissions Estimator.
- ***gensig*** – Generic signal test environment.
- ***samples*** – Sample output data from the TRANSIMS components.
- ***synpop*** – Data files used by the Population Synthesizer. These files include the following data, which are used to generate a population that then is located on the Bignet Network:
 - PUMS (*pums*),
 - STF3A (*stf*), and
 - MABLE/GEOCORR (*NewMexico_MABLE.csv*)
- ***toynet*** – A small test scenario used to demonstrate feedback between the Route Planner and Traffic Microsimulator.

1.1.4 ***metis-4.0*** Directory

The *metis-4.0* directory contains the distribution of *metis-4.0* used by the Traffic Microsimulator to partition the transportation network among the available CPUs.

1.1.5 ***mpich*** Directory

The *mpich* directory contains Message Passing Interface (MPI) distribution 1.2.0, which is used by the Traffic Microsimulator for parallel communications.

1.1.6 ***pvm*** Directory

The *pvm* directory contains the distribution of Parallel Virtual Machine (PVM) 3.4.3, which is used by the Traffic Microsimulator.

1.1.7 ***scripts*** Directory

The *scripts* directory contains the *editconfig* script used to run the configuration file editor, *xeena*, and the script *Msim.csh* that can be used to run the Traffic Microsimulation.

1.1.8 *source* Directory

The *source* directory contains the following source code subdirectories for the TRANSIMS components.

- *ACT* – TRANSIMS Activity Generator
- *ACTL* – Simplified Activity Generator
- *CA, PAR, TBX* – Traffic Microsimulator
- *CALIB* – Traffic Microsimulator calibration output filters
- *ENV* – Emissions Estimator
- *GBL* – Global definitions and methods used by other TRANSIMS components
- *IO* – TRANSIMS file interface definitions and methods
- *ITDB* – Iteration Database
- *NET* – TRANSIMS Network
- *OUT* – TRANSIMS Output
- *PLAN* – TRANSIMS route plan definition and methods
- *POPL* – Simplified Population Generator
- *ROUTER, THREADS* – Route Planner
- *SEL* – TRANSIMS Selector/Iteration Database
- *SYNPOP* – Population Synthesizer
- *TRANSIT* – Transit methods
- *TRAV* – Traveler definitions
- *VEH* – TRANSIMS Vehicle file generator
- *VIS, mui* – Output Visualization
- *XML* – xml files describing TRANSIMS configuration file keys for use with xena configuration file editor

The *source* directory also contains the following files for the TRANSIMS components.

- *Makefile* – a symbolic link to *source/Makefile.main*. This file is used to compile the TRANSIMS components in the *TRANSIMS_HOME* directory.
- *Makefile.** – *Makefile* files for compilation of TRANSIMS components.
- *fstream, iostream, sstream* – special include files for TRANSIMS components.

1.1.9 *sprng* Directory

The *sprng* directory contains the distribution of the scalable parallel random number generator libraries from the National Center for Supercomputing Applications as part of the DARPA/ITO Scalable Software Library Technology Initiative. This is the random number generator used by many of the TRANSIMS modules.

1.1.10 *xml-xerces* Directory

The *xml-xerces* directory contains the source code for the *xerces* XML parser, developed by the Apache Software Foundation (<http://xml.apache.org/xerces-c/index.html>). *Xerces* is used to read and write XML configuration files.

The XML editor, *Xeena*, can be used to examine and modify configuration files. It is available without charge, but is not included in this distribution. It is available from <http://www.alphaworks.ibm.com/tech/xeena>.

In order to use *Xeena*, Java version 1.1.5 or higher must be available. Edit the file *TRANSIMS_HOME/scripts/editconfig.sh* and change the paths given for *JAVA_HOME* and *XEENA_HOME* so that they are correct for your system.

2. SYSTEM REQUIREMENTS

2.1 Hardware Requirements

We have tested TRANSIMS on Intel hardware with Pentium II and Pentium III processors that have 400 MHz or greater and on Sparc Enterprise 4000 hardware with 250 MHz processors. Although slower processors can be used, they will result in longer execution times for the TRANSIMS programs.

2.1.1 Memory Requirements

Memory requirements of TRANSIMS components depend on the scenario/network that is used. The scenarios supplied with this distribution use less than 128 megabytes of memory except for Bignet, which requires multiple processors (at least four) and one gigabyte of memory.

Memory requirements for the Output Visualizer depend on the size of the data files and are controllable by the user when the Visualizer is run.

2.1.2 Disk Requirements

Three gigabytes of disk space support the execution and data collection for TRANSIMS components using the output specifications in the TRANSIMS configuration files supplied with the distribution. If the user increases output collection, additional disk space may be required.

2.1.3 Operating System

TRANSIMS has been tested on Red Hat Linux, Version 6.1 and 6.2 and Solaris Version 7.0. Other versions of the operating system may work, but this distribution has not been tested on them.

2.1.3.1 Linux

To run the Traffic Microsimulator under PVM or MPI, the Linux kernel must be compiled with networking support and must have assigned an IP address and a host name.

An actual network card is not required. The following options must be selected in the Linux kernel configuration:

- networking support (CONFIG.NET),
- System V IPC (CONFIG_SYSVIPC),
- TCP/IP networking (CONFIG_INET),

- dummy-net driver support (`CONFIG_DUMMY`), or
- the appropriate network card driver.

The default kernel shipped with Red Hat 6.1 and 6.2 is configured with the appropriate options. The following package categories should be selected during Red Hat Linux installation to run the TRANSIMS components:

- X Window System,
- Mesa/GL, and
- Glut.

Additional package categories should be selected to compile the TRANSIMS components:

- C Development,
- Development Libraries,
- C++ Development, and
- X Development.

2.1.3.2 Solaris

To run the Traffic Microsimulator under PVM or MPI, the machine must have an IP address and a host name assigned.

2.2 Software Requirements

The TRANSIMS distribution requires that the user install the following software.

2.2.1 Linux

- X11R6 libraries (*Xmu*, *Xi*, *X11*, *Xext*, *Xt*),
- OpenGL Utilities Toolkit libraries (*glut*),
- Linux libraries (*stdc++*, *ld-linux*, *ICE*, *SM*), and
- Perl

All of the third-party software used by TRANSIMS (see Table 1) is available on Red Hat Linux 6.2 distribution CD-ROMs.

Table 1. Software—Red Hat Packages.*

Name	rpm	location
kernel	2.2.14-5.0	Red Hat 6.2 installation disks

Name	rpm	location
kernel-headers	2.2.14-5.0	Red Hat 6.2 installation disks
gcc	2.95.3-0.20000323	ftp://rawhide.redhat.com/pub/rawhide/i386/RedHat/RPMS/
glibc	2.1.3-15	ftp://rawhide.redhat.com/pub/rawhide/i386/RedHat/RPMS/
libstdc++	2.95.3-0.20000323	Red Hat 6.2 installation disks
make	3.78.1-4	Red Hat 6.2 installation disks
perl	5.00503-10	Red Hat 6.2 installation disks
XFree86	3.3.6-20	Red Hat 6.2 installation disks
Mesa	3.2-2	Red Hat 6.2 installation disks
Mesa-devel	3.2-2	Red Hat 6.2 installation disks
Mesa-glut	3.2.2	Red Hat 6.2 installation disks
Mesa-glut-devel	3.2.2	Red Hat 6.2 installation disks
Pvm	3.4.3-4	Red Hat 6.2 installation disks

* rpm -> <Name>-<rpm>.i386.rpm

2.2.2 Solaris

- Xlib6 libraries in /usr/openwin, OpenGL, OpenGL Utilities Toolkit libraries (glut), Perl
- *Metis*, *pvm*, *mpi*, and *sprng* are supplied with the TRANSIMS distribution.

The third-party software that can be obtained from the World Wide Web sites listed in Table 2.

Table 2. Software—World Wide Web sites.

Software	World Wide Web site
Gnu C++ compiler	www.gnu.org/software/gcc/gcc.html
Mesa	http://www.mesa3d.org/download.html
Glut	http://www-users.cs.unm.edu/~karpis/metis/
PVM	http://www.epm.ornl.gov/pvm/pvm_home.html
MPI	http://www-unix.mcs.anl.gov/mpi/mpich
Perl	http://language.perl.com

3. INSTALLING TRANSIMS

TRANSIMS requires that the operating system be installed with the software described in Section 2. The TRANSIMS distribution requires 640 megabytes of disk space in order to be installed. An additional 2 gigabytes of disk space is required to hold the output collected by running all of the scenarios.

3.1 Installation Instructions

We have divided the installation process into seven steps.

- Step One**
- Select a directory in which the distribution will reside. In these instructions, we will refer to this directory as TRANSIMS_HOME.
 - TRANSIMS users must have read and write permissions in this directory.

- Step Two**
- Mount/open the CD-ROM.

Linux:

- This operation may require root permissions.
- On Red Hat Linux 6.2, the CD-ROM directory is /mnt/cdrom. This directory may be different on other Linux distributions.
- The directory in which the CD-ROM is mounted will be referred to as CD_ROM_DIRECTORY:

```
% /bin/mount <CD_ROM_DIRECTORY>
```

Example:

```
% /bin/mount /mnt/cdrom
```

Solaris:

Use the file manager program (*filemgr*) to open the CD-ROM. The CD_ROM_DIRECTORY will be /cdrom/transims_lanl_1_1.

- Step Three**
- The installation script copies the TRANSIMS distribution from the CD-ROM to the TRANSIMS_HOME directory and installs it.
 - Run the installation script on the CD-ROM by using the following command:

```
% /bin/sh <CD_ROM_DIRECTORY>/install.sh <CD_ROM_DIRECTORY> <TRANSIMS_HOME>
```

Example:**Linux:**

```
% /bin/sh /mnt/cdrom/install.sh /mnt/cdrom /home/transims
```

Solaris:

```
%/bin/sh /cdrom/transims_lanl_1_1/install.sh /cdrom/transims_lanl_1_1 /home/transims
```

- Step Four**
- Make sure that you have read and write permissions on the *TRANSIMS_HOME* directory and subdirectories.
 - If necessary, change the file permissions in the TRANSIMS distribution.
- Step Five**
- Set the environment variable *TRANSIMS_HOME* for all users to run TRANSIMS.

- Bash Shell: Add the following line to your *.profile*

```
export TRANSIMS_HOME=<full path name of directory where TRANSIMS is installed>
```

- C-Shell: Add the following line to your *.cshrc*

```
setenv TRANSIMS_HOME <full path name of directory where TRANSIMS is installed>
```

- Step Six**
- Before starting the Output Visualizer program (*Vis*) make sure that you are running X Windows.

Linux:

- To start the X server, use the *startx* command
(`/usr/X11R6/bin/startx`).

Solaris:

The X server on Solaris is usually started automatically at boot time.

- Step Seven**
- At this point, the TRANSIMS installation is complete.
 - Linux/Intel and Sparc/Solaris binaries are distributed on the CD-ROM and compiled for the operating system versions given above. No compilation is needed unless you are installing on another platform or version of the operating system.
 - The *TRANSIMS_HOME/data/samples* directory contains sample output from the TRANSIMS components. The installation of the output is optional. For each scenario for which output is desired (bignet, calnet, toynet, gensig, freeway1, freeway3, left2, merge2, and tee), perform the following steps.

Step 1:

```
% cd TRANSIMS_HOME
```

Step 2:

`% gunzip CD_ROM_DIRECTORY/samples/<scenario>.tgz | tar xf`
 where `scenario` is replaced with one of the scenarios listed above.

The space required for each of the components is given below.

<u>Scenario</u>	<u>Size (MB)</u>
bignet	678
calnet	231
toynet	138
gensig	10
freeway1	95
freeway3	211
left2	260
merge2	229
tee	30
Total	1880

3.2 Compilation

3.2.1 Compilation Requirements

The TRANSIMS distribution contains data and programs that demonstrate the TRANSIMS Framework. The distribution also includes the source code for the TRANSIMS modules.

Compiling the source is not necessary to run the components on platforms specified above. If the source requires recompilation for another operating system or hardware platform, the following software must be installed to compile the TRANSIMS components:

- Compiler—Gnu C++ (gcc 2.95.2) or SunPro 5.0 with latest patches.
- Glut Release 3.0 or higher
- Mesa 3.0/GL 3.0
- X11R6 (include files and libraries)
- metis*, *pvm*, *mpi*, and *sprng* from TRANSIMS Distribution or the equivalent versions
- Gnu make

3.2.1.1 Compilation Instructions

Compiling the TRANSIMS components is necessary only if you are installing on a different hardware platform/operating system. If this is the case, we have developed the following three steps to help with such a compilation.

Step One Make sure that the appropriate software is installed.

Step Two The file *TRANSIMS_HOME/source/Makefile.SITE* specifies site-specific locations for the compiler and required software for compiling TRANSIMS. Edit this file to customize for your site.

Step Three Change directory to *TRANSIMS_HOME* and run the *buildit* script:

```
% cd $TRANSIMS_HOME  
% ./buildit
```

If you wish to use the SunPro 5.0 compiler, replace *buildit* in Step Three with *buildit sunpro*.

The file *TRANSIMS_HOME/errs* is a log of the build process. Information messages and errors will be reported in this file. If you want to track the progress of the compilation process, edit the *buildit* script and remove the lines that direct output into the logfile *errs*. TRANSIMS *makefiles* require Gnu *make*. Other *make* utilities will not work with these *makefiles*. The *buildit* script searches for the *make* utility in */usr/local/bin* and */usr/bin* directories.